

Ndf Scale

Straight Switch Turnout

TURNOUT DIMENSIONS

Revised: February 2015

RP-12.49

Design and calculations by Van S. Fehr

(1)	FROG NUMBERS	4	5	6	7	8	9	10	11	12
PROPERTIES OF STRAIGHT SWITCHES										
(2)	Switch Rail Length	1.130	1.131	1.152	1.714	1.783	1.797	1.897	2.360	2.390
(4)	Switch Heel Spread	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068
(5)	Switch Heel Angle (deg.)	3.429	3.426	3.364	2.260	2.172	2.156	2.042	1.641	1.620
LEAD TO THEORETICAL POINT OF FROG										
(8)	Lead	2.806	3.175	3.544	4.634	5.075	5.394	5.875	6.855	7.212
CLOSURE DISTANCE										
(9)	Straight Rail Length	1.365	1.702	2.019	2.461	2.789	2.982	3.345	3.803	4.056
(10)	Curved Rail Length	1.393	1.725	2.038	2.477	2.803	2.995	3.356	3.813	4.066
(11)	Curved Rail Radius	7.374	12.360	18.948	24.009	32.249	40.818	52.209	61.297	73.916
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL										
(12)	1st Point Y1	0.096	0.100	0.104	0.100	0.102	0.102	0.104	0.102	0.103
(13)	1st Point X1	1.471	1.556	1.656	2.329	2.480	2.542	2.733	3.311	3.404
(14)	Mid-Point Y2	0.140	0.148	0.154	0.148	0.151	0.151	0.154	0.152	0.153
(15)	Mid-Point X2	1.812	1.982	2.161	2.944	3.177	3.288	3.569	4.261	4.418
(16)	3rd Point Y3	0.201	0.211	0.218	0.212	0.215	0.213	0.218	0.216	0.216
(17)	3rd Point X3	2.153	2.407	2.666	3.559	3.875	4.033	4.406	5.212	5.432
PROPERTIES OF FROGS										
(18)	Frog Angle (deg.)	14.250	11.421	9.527	8.171	7.153	6.360	5.725	5.205	4.772
(19)	Overall Length	0.674	0.767	0.860	1.029	1.122	1.365	1.421	1.605	1.745
(20)	Toe Length	0.312	0.342	0.373	0.460	0.503	0.615	0.633	0.692	0.767
(21)	Heel Length	0.363	0.425	0.488	0.569	0.619	0.750	0.788	0.913	0.978
(22)	Toe Spread	0.077	0.068	0.062	0.066	0.063	0.068	0.063	0.063	0.064
(23)	Heel Spread	0.090	0.085	0.081	0.081	0.077	0.083	0.079	0.083	0.081
(35)	Wing Rail Extension	0.222	0.252	0.281	0.311	0.341	0.370	0.400	0.430	0.459
(36)	Wing Rail Flare Length	0.113	0.113	0.113	0.113	0.150	0.150	0.200	0.200	0.225
(37)	Wing Rail Flare Width	0.015	0.015	0.015	0.015	0.014	0.014	0.014	0.014	0.013
(38)	Wing Rail Bend Width	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(39)	Wing Rail End Chamfer	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
POINT OF FROG TO INTERSECTION OF CENTERLINES										
(24)	PF to ICL	1.432	1.790	2.148	2.506	2.864	3.222	3.580	3.938	4.296
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS										
For Track Centers of:		0.975	(13 prototype feet)							
(25)	Straight Track Dist.	0.975	1.246	1.513	1.778	2.042	2.304	2.566	2.827	3.088
(26)	Crossover Track Dist.	1.097	1.344	1.595	1.848	2.102	2.358	2.614	2.871	3.128
For Track Center Increment of:		0.075	(1 prototype foot)							
(28)	Straight Track Incr.	0.295	0.371	0.447	0.522	0.598	0.673	0.748	0.823	0.898
(29)	Crossover Track Incr.	0.305	0.379	0.453	0.528	0.602	0.677	0.752	0.827	0.902
GUARD RAILS										
(30)	Parallel End Setback	0.050	0.053	0.056	0.059	0.063	0.066	0.069	0.072	0.075
(31)	Bevel Length	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081
(32)	Flare Length	0.181	0.181	0.181	0.206	0.206	0.206	0.206	0.206	0.225
(33)	Overall Length	0.619	0.619	0.619	0.825	0.825	0.825	0.825	0.825	0.975
(34)	Parallel Length	0.256	0.256	0.256	0.413	0.413	0.413	0.413	0.413	0.525
(37)	Flare Width	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
(38)	Plane Width	0.007	0.007	0.007	0.006	0.006	0.006	0.006	0.006	0.006
(39)	End Chamfer	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019

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(1)	FROG NUMBERS	13	14	15	16	17	18	19	20
PROPERTIES OF STRAIGHT SWITCHES									
(2)	Switch Rail Length	2.435	2.485	3.273	3.288	3.322	3.358	3.414	3.472
(4)	Switch Heel Spread	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068
(5)	Switch Heel Angle (deg.)	1.590	1.558	1.183	1.178	1.166	1.153	1.134	1.115
LEAD TO THEORETICAL POINT OF FROG									
(8)	Lead	7.599	7.986	9.431	9.800	10.158	10.516	10.925	11.334
CLOSURE DISTANCE									
(9)	Straight Rail Length	4.351	4.642	5.224	5.563	5.811	6.056	6.395	6.731
(10)	Curved Rail Length	4.360	4.650	5.231	5.570	5.818	6.062	6.401	6.736
(11)	Curved Rail Radius	88.738	105.199	113.738	132.854	151.268	171.171	195.020	220.687
GAGE LINE OFFSETS ON CURVED CLOSURE RAIL									
(12)	1st Point Y1	0.104	0.106	0.102	0.103	0.104	0.105	0.106	0.107
(13)	1st Point X1	3.523	3.645	4.579	4.679	4.774	4.872	5.013	5.155
(14)	Mid-Point Y2	0.155	0.156	0.152	0.154	0.155	0.155	0.157	0.159
(15)	Mid-Point X2	4.611	4.806	5.885	6.070	6.227	6.386	6.611	6.838
(16)	3rd Point Y3	0.218	0.220	0.216	0.219	0.219	0.219	0.222	0.224
(17)	3rd Point X3	5.698	5.966	7.191	7.460	7.680	7.900	8.210	8.520
PROPERTIES OF FROGS									
(18)	Frog Angle (deg.)	4.405	4.091	3.818	3.580	3.369	3.182	3.015	2.864
(19)	Overall Length	1.885	2.025	2.103	2.243	2.383	2.523	2.602	2.681
(20)	Toe Length	0.813	0.859	0.934	0.949	1.025	1.101	1.116	1.131
(21)	Heel Length	1.072	1.166	1.169	1.294	1.358	1.422	1.486	1.550
(22)	Toe Spread	0.062	0.061	0.062	0.059	0.060	0.061	0.059	0.057
(23)	Heel Spread	0.082	0.083	0.078	0.081	0.080	0.079	0.078	0.077
(35)	Wing Rail Extension	0.509	0.559	0.589	0.650	0.680	0.709	0.759	0.809
(36)	Wing Rail Flare Length	0.293	0.332	0.346	0.388	0.402	0.415	0.454	0.494
(37)	Wing Rail Flare Width	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
(38)	Wing Rail Bend Width	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
(39)	Wing Rail End Chamfer	0.022	0.022	0.022	0.022	0.022	0.022	0.022	0.022
POINT OF FROG TO INTERSECTION OF CENTERLINES									
(24)	PF to ICL	4.654	5.012	5.370	5.728	6.086	6.444	6.802	7.160
DATA FOR CROSSOVERS: PF TO PF ON PARALLEL TRACKS									
For Track Centers of:		0.975	(13 prototype feet)						
(25)	Straight Track Dist.	3.348	3.609	3.869	4.129	4.389	4.648	4.908	5.168
(26)	Crossover Track Dist.	3.386	3.643	3.901	4.159	4.417	4.676	4.934	5.192
For Track Center Increment of:		0.075	(1 prototype foot)						
(28)	Straight Track Incr.	0.974	1.049	1.124	1.199	1.274	1.349	1.424	1.499
(29)	Crossover Track Incr.	0.976	1.051	1.126	1.201	1.276	1.351	1.426	1.501
GUARD RAILS									
(30)	Parallel End Setback	0.078	0.081	0.084	0.088	0.091	0.094	0.097	0.100
(31)	Bevel Length	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081
(32)	Flare Length	0.225	0.225	0.256	0.256	0.256	0.256	0.256	0.256
(33)	Overall Length	0.975	0.975	1.238	1.238	1.238	1.238	1.238	1.238
(34)	Parallel Length	0.525	0.525	0.725	0.725	0.725	0.725	0.725	0.725
(37)	Total Flare at End	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
(38)	Bevel Cut at End	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
(39)	End Chamfer	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019